

February, 1956.

Time Allowed - 3 hours.Paper No. 1.

Answer Six (6) questions only.

2. 1. (a) List instruments suitable for the measurement of A.C. and describe the principle, construction and action of one of them.
(b) A moving coil instrument gives full scale deflection with 5 mA through the coil. The resistance of the coil is 10Ω .
How may it be adapted to read:-
1. Current to 1A 0.05025
2. Voltage to 20V 399
3. 2. An alternating voltage of 100V $50 \sim$ applied to a coil. The current taken is 5 amps and the power absorbed is 210 Watts. Calculate the resistance and inductance of the coil and the power factor. 0.42 , $139.3 \mu F$, $72.75 mH$
What size capacitor in series would make the above circuit resonant, and in this case what would an ammeter in the circuit and a voltmeter across the capacitor read. $11.9 \mu F$, $272 V$
1. 3. Discuss the electrical effects which may lead to sparking at the brushes of a D.C. motor or generator and explain how these effects may be minimised.
4. 4. An electromagnet has a mean length of 50 cms., a cross section of 10 sq. cms. and an air gap of 5 m.m. Flux density of 15000 is required in the gap. Calculate the ampere turns necessary for this flux density. Permeability of the magnetic material is 750.
6. 5. Sketch the anode characteristics of the following valves:- (a) Diode (b) Triode (c) Tetrode (d) Pentode. comment on these characteristics and give an application of each type.
4. 6. What are the conditions for maximum power output from a linear valve amplifier? How is this modified in practice from consideration of distortion in an A/F power amplifier? What are the important requirements of the output valve in an A/F amplifier? Compare the contrast a Triode with a Pentode as an output valve in such an amplifier.
5. 7. (a) What is the function of the detector in a radio receiver? Explain in detail the operation of any one type. (b) Mention other types in common use, stating their advantages and disadvantages and comparing them with the detector you have described in part (a).

PROFESSIONAL EXAMINATION FOR COMMISSIONED ELECTRICAL OFFICER (AR).

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PAPER NO. 2.

NAVAL AIR RADIO APPLICATION.

TIME ALLOWED 3 HOURS.

Candidates are to answer five (5) questions. All questions carry equal marks. The use of test books is not permitted. Question 1 is compulsory.

2. 1. (a) How is the gain of the receiver controlled in AN/APS4.
4. (b) Why is it necessary to reduce the PRR when switching to maximum range of AN/APS4.
4. (c) What simple tests can be made to determine whether the AN/APS4 transmitter is operating.
4. (d) State the two methods by which the frequency of a reflex klystron may be varied.
4. (e) What method is employed in the AN/APS4 to ensure that the time base starts at the instant of transmission.
2. Describe the action of the V.H.F. relay equipment with control box type 383 in the relay position with R.T.2. receiving.
15. 3. Describe the modifications necessary to allow the ZBX to be used with inner and outer marker beacons.
16. 4. (a) Explain the necessity for AFC in the sono-buoy receiver.
- (b) Give the sono-buoy aligning procedure.
19. 5. List the component units and uses of Test Kit 7.
6. (a) Draw a functional block diagram of AN/APX-2 used in conjunction with a 3cm radar. Show all possible triggering and suppression pulses.
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85 (b) Explain briefly the action of the super-regenerative receiver as used in the transponder in AN/APX-1/2.

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PAPER NO. 3.

(AL) or (AR) NAVAL AVIATION PROCEDURE.

TIME ALLOWED: 3 HOURS.

Candidates are to answer five (5) questions - No. 1 is compulsory. Questions 2 to 6 carry equal marks. The use of text books is not permitted.

1. An aircraft returns from a flight with an item of electrical equipment unserviceable. This is recorded on Form A.700. Describe in detail the procedure when
 - (a) it is repaired and replaced in the aircraft.
 - (b) it is unserviceable by fair wear and tear, and a new item is replaced in the aircraft.
 - (c) it has developed an important defect arising from faulty material.
2. Give a general outline and discuss the advantages and disadvantages of:-
 - (a) Planned inspection servicing.
 - (b) Squadron servicing.
3. List the safety and fire Precautions to be observed in the following:-
 - (a) a hangar.
 - (b) a battery charging shop.
 - (c) a plug bay.
4. Describe the procedure for incorporation of a typical station electrical airframe modification and the publications and forms involved.
5. Describe the Six Volume ~~System~~ of Air Publications.
6. Write briefly on the following:-
 - (a) A.A.2.
 - (b) A.A.21.
 - (c) A.A.25.
 - (d) A. 700.
 - (e) A.703.
 - (f) A.P.(N) 5.
 - (g) A.P.(N) 380 series.
 - (h) A.T.L.
 - (i) S.T.I.
 - (j) S 118 series.
 - (k) F.A.E.